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Abstract

This paper builds on the recent literature on the importance of occupational and industry experience on wages and extends Kambourov and Manovskii's (2002) study using British data. Occupational experience is estimated to make a significant contribution to wage growth, while the evidence on industry specificity is not very supportive. The second contribution of the paper is that it assesses whether there is heterogeneity in the estimated returns to work experience across 1-digit industries and occupations. The findings suggest that industry and occupational experience is important for individuals in *professional* and *managerial* jobs or jobs in the *banking* and *finance* sector.

***JEL classification*:** J24, J31, J41

***Keywords*:** Occupational Experience; Industry Experience; Wages

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1 Introduction

In recent years there have been some developments in the labour economics literature on the issue of specificity of the accumulated work experience and its importance in the determination of wages. Particularly, a number of studies have departed from the traditional view that work experience is described by firm-specific and general labour market components, and explored whether the skills and experience obtained are occupation or industry specific.

Studies on displaced workers have revealed that industry may be an important dimension across which skills are transferable (Podgursky and Swaim 1987; Addison and Portugal 1989 a, b; Kletzer 1991; Ong and Mar 1992; Carrington 1993; Ong and Lawrence 1993; Neal 1995). Continuing in that direction, Parent (2000) took a more direct approach and estimated earnings equations with industry experience included in the regressors vector. According to his findings it is industry specificity rather than employer specificity that is important in wage growth.

Regarding the occupation specificity of work experience, the first paper that directly examined the significance of occupational investment (as part of the

post-school human capital) in wage determination, is a study by Shaw (1984). Shaw argued that occupational investment makes a very important contribution to individual's earnings profiles, "*empirically dominating the standard experience variable as a proxy for the stock of general human capital investment embodied in the individual*" (pp. 338). Shaw (1987) in a later study also highlighted the importance of the intensity of investment in occupational skills and the transferability of occupational skills in the occupational change process.

Goldsmith and Veum (2002) brought together the literature on industry and occupational specificity and examined the contribution of industry and occupational experience to wage determination. All forms of workplace experience (employer, industry and/or occupation specific) were estimated to have a positive and significant effect on individuals' wages. Kambourov and Manovskii (2002) in their study reported similar results regarding the importance of occupational specificity in the acquired work experience. However, in contrast to Goldsmith and Veum (2002) they found that when individuals' experience in an occupation is included in the estimated wage equation, employer and industry tenure have little importance in explaining the variation in wages. Subsequently, several other studies also emerged in the literature that provided further evidence on the significance of occupational experience in the wage determination process (Kwon et *al*., 2004; Hagerdorn et *al*., 2005; and Pavan, 2005).

This paper builds on and contributes to this literature on the specificity of work experience. In particular, the first contribution of this study is to extend the Kambourov and Manovskii (2002) analysis using the British Household Panel Survey (BHPS). This is the first study, to the author's knowledge, that uses British data. The BHPS dataset contains retrospective records of the

individuals from the time they first entered the labour market that enables the researcher to measure the number of years the respondent has spent with a particular employer and in a specific industry or occupation. The analysis finds significant returns to occupational experience, while the evidence on industry experience is not very supportive, in line with Kambourov and Manovskii's (2002) results.

The second contribution of the paper is that it examines whether there is heterogeneity in the estimated returns to occupational and industry experience across the broadly defined 1-digit occupations and industries. Obtaining an estimate on the average effect of industry or occupation specific experience may mask considerable heterogeneity across the different industry sectors and occupations. A closer examination on the heterogeneity of the returns to occupation and industry experience can be of significant importance in better understanding wage growth, and may be enlightening on issues related to individuals' career choices and labour market mobility. Indeed the findings support the notion of heterogeneity. In particular, it is in high-skilled jobs – like *managerial* and *professional* occupations - that there are substantial returns to occupational experience, while the returns to industry experience are observable only in the *banking* and *finance* sector.

The paper is organised as follows. In ***Section 2*** the methodology is explained, followed by a description of the data set in ***Section 3***. The main findings are discussed in ***Section 4***, including the implications of the findings on the evolution of an individual's earnings profile. The issue of heterogeneity in the estimated wage premia across the 1-digit occupations and industries is addressed in ***Section 5***. Finally ***Section 6*** concludes the discussion, highlighting the major findings and implications of this study.

2 Methodology

The framework adopted here is similar to the one Parent (2000) and Kambourov and Manovskii (2002) employed in their studies and is based on a standard wage equation model. The working assumption is that employer-tenure, total industry and occupational experience are competing effects in the wage determination process. Initially, consider the following wage equation model

$$w_{ijt}=\alpha+\beta_1 T_{ijt}+\beta_2 E_{it}+X'_{ijt}\beta_n+\varepsilon_{ijt} \qquad (1)$$

where w_{ijt} represents the log hourly wage of the individual i, working for employer j, in the period t. T_{ijt} represents employer tenure, E_{it} is total labour market experience and X_{ijt} is a control vector that includes individual and workplace characteristics other than industry or occupational experience. If industry or occupational experience plays a significant role in wage setting, then one would expect that their inclusion in the control vector, alongside employer tenure, would decrease the magnitude of tenure on wages. A portion of the estimated tenure effect should be attributed to the industry/occupation-specific experience that an individual has obtained in work rather than to employer-specific human capital.

In order to address the issue of industry and occupational specificity in the accumulated work experience, this study investigates whether the employer tenure effect decreases when they are alternatively controlled for in the estimated model. Initially, the wage equation model is estimated without including a variable for either industry experience or occupational experience. The wage equation model is then re-estimated taking into account industry

and occupational experience separately, and then both. Any observed decrease in the magnitude of tenure effect in these models may provide an insight on how total working experience should be decomposed and may have important implications on the evolution of life cycle earnings and on job mobility issues.

Consider now a wage equation model

$$w_{ijt}=\alpha+\beta_1 T_{ijt}+\beta_2 E_{it}+\beta_3 Ind_{ikt}+\beta_4 Occ_{iht}+X'_{ijt}\beta_n+\varepsilon_{ijkht} \qquad (2)$$

where industry experience Ind_{ikt} in k industry sector, and occupational experience Occ_{iht} in the h occupation are included in the regressors alongside employer tenure (T_{ijt})and total labour market experience (E_{it}). One issue of concern related to the estimation process is the fact that the obtained coefficients of interest (β_1, β_2, β_3 and β_4) based on least squares are likely to be biased due to potential correlation between these variables and unobserved individual and job/sector match effects. In particular, the error term ε_{ijkht} can be decomposed into five components,

$$\varepsilon_{ijkht}=\delta_i+\theta_{ij}+\gamma_{ik}+\omega_{ih}+\lambda_{ijkht} \qquad (3)$$

where unobserved heterogeneity is composed of an individual effect (δ_i), a job-match effect (θ_{ij}) ,an industry-match effect (γ_{ik}) and an occupation-match effect (ω_{ih}). The individual effect (δ_i) represents the individual's unobserved ability, while the job-match effect (θ_{ij}) captures the quality of the employment relationship stemming from search activity. The inclusion of an industry experience variable in the wage equation adds an extra source of unobserved heterogeneity. This is the unobserved industry-match effect (γ_{ik}) that represents the unobserved quality of the match between the individual and

the industry sector he works in (Parent, 2000). Furthermore the self-selection of workers into occupations means that there is an additional source of endogeneity bias driven by the unobserved quality match between the individual and his current occupation (ω_{ih}). In total, therefore, in total there are four sources of potential endogeneity bias in the wage equation represented by equation (2). Individuals with high unobserved ability (high δ_i) will most likely experience lengthy and less interrupted employment spells, while better matches, and choices of job and industry (high θ_{ij} and γ_{ik}) are more likely to occur to individuals with more experience, as the result of human capital and lengthy search. In addition, individuals with high unobserved ability are likely to choose high-skilled and well-paid occupations (high ω_{ih}). This potential endogeneity bias is discussed in more detail in ***Section 4***.

3 Data Description

The empirical analysis is based on the BHPS, a nationally representative household panel survey first conducted in the autumn of 1991 and annually thereafter, covering the period between 1991 and 2001 (*Waves 1-11*). The analysis uses only male individuals between 18 and 60 years of age who reported working full-time (at least 30 hours per week). People who are self-employed, serving in the military or, employed in the agricultural sector are excluded from the sample[1]. In addition, individuals with missing information or imputed data in the variables used in the empirical analysis are not considered. The derived sample is an unbalanced panel sample of 943 male

[1] Similar sample restrictions are also adopted in other studies in the literature, see Kambourov and Manovskii (2002) and Sullivan (2006) for an example.

workers, who are observed in 1247 employer-matches overall, giving a total of 5244 observations (***Table 1***).

The BHPS is quite informative on the employment status and labour market history of the respondents. In each wave the individuals' current labour market status is reported, as well as their employment history for the period beginning on 1st of September a year prior to the interview. In addition, information on the complete labour market history of the individuals since leaving full-time education for the first time is recorded in the second wave, and complete job data are also collected at the third wave (1993). Based on these records, one is able to follow the individuals since they first enter the labour market and construct various measures of their accumulated work experience. For the purpose of the analysis, four different levels of specificity are pursued: employer-specific tenure; general labour market experience; industry experience; and occupational experience. The employer tenure variable refers to the length of time (part-time or full-time) an individual has spent with his current employer until the date of the interview and is restricted only to those who were employed at that time. General labour market experience measures the total (full-time and part-time) work experience an individual has obtained as an employee so far. The variable is constructed only for those individuals who were present in ***Wave 2*** and had left full-time education at the time the survey was conducted, since the second wave of the BHPS is the basis for constructing the total actual work experience for the rest of the waves[2].

Industry and occupational experience are also constructed using the individuals' employment history records. The former refers to the years an

[2] A detailed description on how the four experience variables are constructed is provided in the Appendix.

individual has been working in a particular industry and can be thought of as a proxy for the industry-specific human capital[3] accumulated in work. Similarly, occupational experience measures the years a worker has spent in a certain occupation, which can be seen as a proxy of the individual's occupation-specific human capital acquired over these years. The variables are constructed alternatively at the 1, 2 and 3-digit level of industry and occupation classification[4] and only employment spells where the respondent reported working for an employer (not self-employed), either part-time or full time, are taken into consideration.

A distinction has to be made between two alternative ways of measuring these two variables. One can construct industry and occupational experience solely based on continuous spells in the data, or alternatively may avoid imposing such restrictions and consider all employment spells. In the first case, industry experience is measured by the consecutive years an individual has been working in the same industry. While, in the latter case, industry experience is measured by the years a worker has been in the same industry in total. In order to make this distinction clear, consider the case of an individual who reports working in an industry that he had worked in previously, but which is different to the most recent previously reported sector. If one measures industry experience based on the continuous spells then industry experience should reset to zero. However, when no such

[3] This paper uses both "experience" and "human capital" terms when referring to wage determination process. Although accumulated human capital is unobserved, as Sullivan (2006) argues, it is difficult to explain any observed wage growth within occupations and industries without considering the contribution of occupation and industry specific human capital.

[4] The 1, 2 and 3-digit occupation and industry classifications used throughout the paper are described in the Appendix.

restrictions are imposed, industry experience will not equal to zero but the total number of years he had spent in that sector in the past.

The difference between these two ways of measuring industry experience can be thought of as reflecting different rates of depreciation of the industry-specific human capital. If one thinks that industry-specific human capital depreciates rapidly, then it might be better to use continuous spells. However, the industry experience variable based on not necessarily continuous spells most likely does not eliminate much of the variance in employer tenure that is important in the identification of the tenure effect. Since there is no information on the rate at which industry and occupation specific human capital depreciates, this study adopts the latter method for their desirable feature in the estimation process of tenure effect.

The measures of occupational and industry experience used in this paper bear some important differences with the data used in other studies. Firstly, in this study individuals are traced back to the time they first entered the labour market and occupation and industry experience are calculated accordingly, similar to Sullivan's (2006) approach. In contrast, Kambourov and Manovskii (2002) set the initial occupational and industry experience equal to the corresponding employer or position tenure in that year. Furthermore, while other studies (like Kambourov and Manovskii, 2002) measure occupation and industry experience based on continuous employment spells only, no such restriction is imposed in this paper. Moreover, part-time employment spells are included here in the calculation of the experience spells, whereas in other papers occupation and industry experience rely only on full-time employment spells (Kambourov and Manovskii, 2002; Sullivan, 2006). Finally, occupation and industry switches within a particular employer-match are considered genuine mobility patterns in this analysis, whereas Kambourov

and Manovskii (2002) do not allow within-firm occupation and industry switches, while Sullivan (2006) permits only within-firm occupational mobility. Any attempt therefore to interpret potential discrepancies in the findings between this study and other papers in the literature should take under consideration these differences in the definitions of the variables of interest and any other data dissimilarities.

An examination of the raw data reveals some interesting information concerning the occupational and industry mobility patterns of the respondents (***Table 2***). Around 40 percent of the individuals in the sample appear to have changed occupation at least once at the 1-digit level of classification, with the average worker holding 1.6 different occupations in the period covered in the sample[5]. The figures increase when more detailed levels of groupings are used, indicating that although people may remain within the same broadly defined occupations, they may still change the type of job they are performing. Furthermore, individuals are more mobile across occupations than industry sectors, with all the corresponding figures being lower for all levels of industry classification. Interestingly, when one looks at the within-employer mobility patterns, as one would expect individuals are notably less mobile, especially across sectors. At the 1-digit level, only 25 and 36 percent of people appear to change industry sector and occupations respectively, while being employed by the same employer.

Continuing the discussion on occupation and industry mobility, ***Table 3*** presents the percentages of people who stay in the same occupation/industry

[5] When considering only the individuals who have changed occupation at least once, the average worker appears holding 2.3 different occupations over the sample period.

from wave-to-wave[6]. Roughly 80 percent of the people report an occupation that is the same as their most recent previously stated occupation (1-digit level). Although there is some diversity across occupations in the corresponding percentages, with the *clerical and secretarial* occupations on the lower bound and the *personal and protective services* at the upper bound, the picture is quite similar for all occupations. As expected, when one considers 2 or 3-digit levels of classification, the overall percentages fall to 72 and 68 percent respectively. The industry mobility patterns are quite similar as well, although now a higher percentage of people appear to stay in the same industry from wave-to-wave. A more detailed picture of the wave-to-wave occupation and industry mobility is provided in ***Tables A1*** and ***A2*** (Appendix), where the reader can also see which occupations/industries the individuals move to.

These industry and occupation mobility patterns are reflected in the length of the accumulated industry and occupational experience (***Table 1***). Individuals on average stay in the same 1-digit level industry sector for more than 14 years. Accumulated industry experience falls to 11.5 and 10 years respectively when considering more narrowly defined sectors (2 or 3-digit level). Average obtained occupation-specific experience is lower than the corresponding industry experience figures for all levels of classification, but similar to industry experience reduces monotonically with the level of the occupational groupings. Regarding the other two human capital variables of interest, the mean duration of employer tenure is something less than 9 years and, on average, individuals appear to have spent more than 23 years working in the labour market.

[6] The waves are not necessarily consecutive, instead they represent the current and the most recent observed one.

4 The Role of Industry and Occupational Specificity

In order to assess the importance of the different levels of specificity in the accumulated experience to the wage determination process four alternative versions of the wage equation model are estimated. A standard Mincer-style wage equation where only employer-tenure and general labour market experience are considered, and three more wage equations where industry experience and/or occupational experience are alternatively included in the model specification[7]. The dependent variable in the estimated earnings equations is the logarithm of the hourly wage rate, adjusted for paid overtime. All four human capital variables of interest enter the wage equations as cubic polynomials. The vector of regressors also includes controls for individual's formal qualifications, industry sector, occupation, establishment size, region and a time trend.

Regarding the estimation process of the wage equation models, ***Section 2*** has highlighted the potential endogeneity bias in the derived effect of the four human capital variables of interest, driven by their possible correlation with unobserved individual characteristics and match effects. The issue of endogeneity bias was pursued by employing the Altonji and Shakotko (1987) instrumental variable approach and performing a Hausman endogeneity test. In particular the instruments used for employer-tenure, industry and occupational experience are their deviations from their spell specific means and for actual labour market experience the deviation from the individual

[7] The author's preferred wage equation is the one using the full specification, where occupational and industry experience along employer tenure and general labour market experience are included in the regressors.

mean[8]. The tests were performed at the 1, 2 and 3-digit level of occupational and industry classification, but in none of the cases examined did the Hausman test provide any evidence of correlation with the unobserved individual characteristics or match effects[9].

Furthermore, because of the panel element of the data set used in this study and the fact that the same group of individuals is followed over time, generalized least squares (GLS) are employed. In particular, two alternative observation units are considered: (I) the individual, and (II) the individual employed by a particular employer, i.e. the employer-employee match. When a respondent, in the latter case, reports working for a different employer than a year ago, he is treated as a different observation unit[10]. Using the employer-employee match as an observation unit allows the GLS estimator to efficiently account for possible unobserved quality match effects.

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[8] For example, the instrumental variable for employer tenure T_{ijt} is $T_{ijt} - \overline{T}_{ij}$, where $\overline{T}_{ij}$ is the average tenure of individual *i* working for employer *j*. For the squared and cubic terms the instruments are defined in a similar way: $\left(T_{ijt}\right)^2 - \left(\overline{T}_{ij}\right)^2$ and $\left(T_{ijt}\right)^3 - \left(\overline{T}_{ij}\right)^3$ respectively. As Altonji and Shakotko (1987) argue, by construction the instruments are orthogonal to the unobserved employer-employee match. The instruments for general labour market experience, industry and occupational experience are also defined by their deviations from the spell-specific means.

[9] The performed Wu-Hausman test did not reject the null hypothesis of exogeneity with a p-value of 0.128 (1-digit level), 0.290 (2-digit level) and 0.211 (3-digit level).

[10] Although the BHPS is not an employer-employee match data set, in every wave respondents who reported having a new job were asked whether it was with the same employer from their past job or with a new employer. This information enables the construction of a match that corresponds roughly to an employer-employee match. The drawback here is that employees who return to an employer they have previously worked for cannot be identified and therefore are treated as though they are working for a new employer.

The four wage equations described above are estimated and the two, five, and ten-year effects of employer-tenure, general labour market experience, industry and occupational experience are calculated from the derived polynomials and presented in ***Table 4***. When industry and/or occupational experience are included in the specification, three alternative equations are estimated, depending on the level of industry and occupational classification used when calculating the experience spells.

Starting the analysis with the GLS (I) estimates (first part of ***Table 4***), the results provide evidence mainly on the significance of employer-tenure, general labour market experience and occupational experience. Specifically, employer-tenure is calculated to have a 4.6 to 6.4 percent effect on log wages (ten-year effect), depending on the specification used. The returns to tenure decrease marginally when either industry and/or occupational experience (at all three levels of classification) are included in the regressors. As suggested from the literature, general labour market experience appears to make the largest contribution to wages from all four human capital variables of interest. Its ten-year effect is calculated to exceed the 30 percent in all specifications considered. Occupational experience is estimated to have a positive effect on log wages, with a ten-year effect of around 4 to 5 percent. Interestingly, this ten-year effect decreases with the classification level used for the calculation of the occupational spells (from 1-digit to 3-digit level). Regarding industry experience, it is only at the 3-digit level that it appears to have some marginal effect on wages (ten-year effect is less than 3 percent).

The picture changes when the employer-employee match is considered as the observation unit in the estimates (second part of ***Table 4***). In particular, the returns to tenure decline in magnitude and statistical significance. It's mainly

when industry and occupational experience are not included in the equation that employer-tenure has some effect on wages. General labour market experience continues to explain a large part of the variation in log wages, with an estimated ten-year effect of around 32 percent. Occupation specific experience has a positive effect (around 4 percent) on wage determination. As before the ten-year effect falls in magnitude when experience spells are measured at a more detailed level of occupational classification. On the contrary, the evidence is not so supportive for industry specificity. Only in one case is industry experience found to have a positive and statistically significant (at a 5 percent level) effect on log wages. GLS (II) is the author's preferred estimator since it efficiently accounts for time-constant unobserved job match effects.

The discussion on the contribution of occupational and industry experience is further supported by equality tests performed on their two, five and ten-year effects. The null hypothesis of equality is rejected (apart from the case of the 3-digit level of industry and occupational classification – last column of ***Table 4***), suggesting that industry specific and occupation specific experience make different contributions in the wage determination process.

An interesting pattern revealed by the results is that the ten-year effect of occupational experience[11] reduces monotonically in magnitude with the number of digits in the occupation classification. This may appear to contrast Kambourov and Manovskii (2002) findings that human capital is specific to 3-digit occupations, since the returns to occupational experience increase with the level of occupation classification. However, when they allow within-firm

[11] The estimated two and five-year returns to occupational experience remain constant, regardless of the level of occupational classification used.

occupation switches[12], then their occupational experience effect reduces as the level of occupation classification increases. This should not necessarily be interpreted as evidence that accumulated human capital is more specific to 1 rather than 2 or 3-digit occupations. It may be due to the presence of potential measurement error in the occupations. Although one would expect that there is some noise in the occupation codes, one would probably anticipate this to be more prevalent in the narrowly defined 3-digit classifications, compared to the fairly broadly defined 1-digit groupings. According to Kambourov and Manovskii (2002) greater measurement errors in occupational experience will bias downwards the corresponding estimated returns. In the case of measurement errors in occupational experience, the estimated effects can be interpreted as a lower bound of the actual contribution of occupational experience to wage growth.

Overall, the results of the wage regressions suggest that occupational experience makes a positive and significant contribution to wages that is at least as large as the returns to employer tenure. This finding is in line with other studies in the literature, like Kambourov and Manovskii (2002), Kwon et *al*. (2004), Hagedorn et *al*. (2005), Pavan (2005), and Sullivan (2006) who report sizable returns to occupational experience. On the other hand, the evidence is not very supportive regarding the importance of industry specificity. This comes in contrast to Goldsmith and Veum (2002) and Sullivan's (2006) findings of significant industry experience effects, but is in accordance with Kambourov and Manovskii (2002) who report virtually no returns to industry experience.

[12] In this case occupation changes are identified based on whether the respondent reported an occupation different from his most recent previous stated occupation (same approach as the one adopted in this study).

5 Heterogeneity in the human capital wage premia

The discussion in the previous section clearly indicates that occupational experience is an important determinant of an individual's earnings profile. The more experienced an individual is in a particular occupation, the higher his wages are going to be. Workers who acquire specific knowledge and experience in their chosen occupation are likely to be rewarded more by their employers, ceteris paribus. However, one question that the analysis above does not answer is whether or not this finding is uniform across the different occupations. Brown et *al*. (2004) suggest that while individuals work in high-skilled occupations by choice, individuals who are demand-side constrained (due to low levels of educational attainment) are allocated to low occupations. Furthermore, the intensity of human capital investment in occupational skills appears to vary across occupations, with *professionals* and *managers* being among the highest in the rank (Shaw 1987). Therefore, it is quite useful to know whether there is homogeneity in the returns to occupation-specific experience across various occupations, or whether there are different patterns dictated by the nature of each occupation. Similarly, although the analysis in ***Section 4*** provides limited evidence on the importance of industry specificity on earnings profiles, the estimated returns to the four types of work experience may differ across industry sectors. This section explores the heterogeneity issue and examines whether the previously estimated wage premia are driven by particular occupations or industry sectors.

Heterogeneity across occupations is explored by re-estimating the full-specification wage equation with the inclusion of 1-digit level occupation interaction variables with the polynomials of employer tenure, general labour

market experience, industry and occupational experience[13]. The occupational and industry experience used in this section are based on the 1-digit level of occupation and industry classification respectively. Similarly, the heterogeneity across the industry sectors is addressed with the use of 1-digit industry interaction terms.

The findings from the estimation of the earnings equations are presented in ***Tables 5*** and ***6***. Specifically the tables summarise the derived ten-year effect of all four types of accumulated labour market experience across the different occupations and industries. In addition, two different tests are used to examine the significance of the results. Firstly, equality tests are performed on the interaction terms (Test 1) in order to assess the statistical significance of any heterogeneity observed in the calculated wage premia, and the p-values of the performed tests are presented at the bottom of the two tables. For example, the null hypothesis of Test 1 reported in the first column of ***Table 5*** is that the occupation interaction terms with the employer-tenure polynomial are all equal. Rejection of that hypothesis therefore implies that there is heterogeneity in the returns to employer tenure across the occupations. Similarly, Test 2 is a specific case of Test 1 and examines whether the joint effect of the interaction terms is equal to zero.

[13] Alternatively, one could estimate wage regressions separately for each occupation and industry sector. The main difference between the two approaches is that when interaction terms are used we allow only the experience variables of interest to vary across occupations and industries, while with the latter approach no such restriction is imposed. For completeness reasons the author estimated also the wage equations for each occupation and industry (not included in the paper), and the results overall are quite similar to those based on interaction terms. Nevertheless, the author's preferred method is the interaction terms approach, primarily because of the relatively small size of the sample used in the paper.

The occupational heterogeneity in the estimated wage premia hypothesis appears to be supported primarily for general labour market experience and occupational experience (***Table 5***). Overall, total work experience is a key factor in determining wage growth in most of the occupations with an estimated ten-year effect ranging from 30 percent to 70 percent. The highest returns are primarily observed in three occupational groups: *managers and administrators*, those in *clerical and secretarial* positions and people in *sales*. Sullivan (2006) also reports large returns for the *sales* and *clerical* occupations. The performed tests provide evidence on the statistical significance of the heterogeneity observed in the calculated returns to general labour market experience.

The previous section suggested that occupational specificity in the accumulated work experience plays a significant role in the wage determination process. Here the estimates imply that the previous findings may after all be driven by some particular occupations and probably are not uniform over the whole landscape of occupations. One can see that there is a strong impact for *managers* and *administrators*, those in *professional* and *associated professional* occupations and in *technical* occupations. Specifically, ten years of accumulated experience as a *manager* or *administrator* appears to increase log wages by 18 percent. The effect is 16 percent for the *professionals* and around 11 percent for the *associate professionals* and those in *technical* occupations. Regarding the remaining occupational groups, there is no evidence to support a significant contribution to wages[14]. The performed tests

[14] When the GLS(II) estimator is used, experience in the *craft and related* occupations appears to have a negative effect on wages, only at a 10% level of statistical significance though. One plausible interpretation could be that the negative effect is actually driven by a low demand for these occupations/skills and possibly recession in the associated industry sectors. In that

verify that these observed patterns between the various occupations are indeed statistically significant, providing further support to the discussion above. This is in line with Shaw's (1987) findings, with *professional* and *managerial* occupations being ranked amongst the highest in terms of intensity of human capital investment in occupational skills.

The calculated returns to employer-tenure suggest a sizable contribution to wage growth for four of the nine occupational groups. Particularly, years of employer-tenure for individuals in *clerical and secretarial*[15], *craft and related*, *personal and protective service* and *sales* occupations are found to raise log wages by around 14 percent. The test on the joint significance of the interaction terms (Test 2) rejects the null hypothesis; however Test 1 on the equality of the interaction terms does not support the heterogeneity scenario. The null hypothesis of equality of the firm tenure effects across occupations is also not rejected (at the 5% level) in Sullivan's (2006) study. Finally, the results on industry experience do not provide any evidence of its contribution to the wage determination process.

The findings presented above support the hypothesis that there is heterogeneity in the experience wage premia across the occupational groups. In addition, it becomes apparent that different types of experience specificity are important for different occupations. General labour market experience is found to be very important for *managers* and *administrators* with a ten-year effect above 60 percent, one of the highest returns among all occupational groups. Occupational experience also makes a significant contribution to wage growth for those in *managerial and administrative* positions. This is true

case, the negative effect may reflect the fact that individuals who chose to stay in those particular occupations missed out the opportunity to move to a more prosperous occupation.

[15] This is supported only when GLS(I) estimator is employed.

for all *professional* occupations as well, where the estimated effect is 10 percent or above. This is in line with Sullivan's (2006) findings on the importance of occupational specificity in *professional* occupations.

The findings on *clerical and secretarial* and *craft and related* occupations are fairly similar. In both occupations total work experience is found to play a significant role on wage growth and there is also some evidence on employer specificity. In the *personal and protective service* occupations, on the other hand, there is evidence only of employer tenure effects, with a ten-year contribution of around 13 percent. Similar to *managers and administrators*, general labour market experience is very important for people in *sales*, where the effect is calculated to be around 63 percent, one of the largest effects accruing to individuals in any occupation, analogous to Sullivan's (2006) findings. Work experience with a specific employer is also important in this occupational group; the effect is found to be above 15 percent. The similarities to Sullivan's (2006) results exist also for *plant and machine operatives*, since both studies report total experience gains but no significant returns to occupational experience. Finally the estimates on occupations in *other services* do not suggest that any particular type of experience specificity is important for wages.

Overall, occupation specific experience is highly valued in *managerial, administrative* and *professional* occupations. Kwon et *al.* (2004) provide a possible explanation for this pattern. According to their findings when occupation specific aspects are important in hiring, then occupational experience has a larger effect on wages than firm tenure. The opposite is true when it is firm specific aspects that are important in hiring. In these occupations, firm tenure makes a larger contribution to wage growth than occupational experience. One way then of explaining the importance of

occupational experience observed in *managerial, administrative* and *professional* occupations may be the fact that individuals in these positions are employed primarily for their occupational expertise and skills and are expected to supply their individual expert output. This will then be reflected in the returns to occupational experience.

When the analysis is repeated with industry interaction terms the findings are not so conclusive (***Table 6***). The heterogeneity hypothesis is supported mainly for the returns to industry experience. The findings suggest a positive ten-year effect of less than 10 percent on log wages for those working in the *banking, finance, insurance, business services and leasing*, while for the *metal goods, engineering and vehicles* industry, the *distribution, hotel and catering* industry and the *transport and communication* industry there are negative effects of around 10 percent[16]. Regarding the remaining industry sectors, there are no statistically significant effects. Finally, the two tests verify the picture described above, since both reject the null hypothesis.

[16] The negative returns in those three industries are somewhat puzzling, since one would expect industry experience to have a positive impact on wage growth. Probably the interpretation of this finding does not lie on the human capital theory but on some story related to industry rents or business cycle. Although in the wage equation model industry dummy variables are included in order to capture any industry effect that may influence earnings, it is possible that the returns to industry experience in these particular cases reflect what is happening that period in these specific industry sectors. The negative returns to industry experience, for instance, may actually be reflecting the fact that a particular industry is going through a recession. One possible interpretation may be that this is a declining industry, where junior workers are either laid off or quit and senior workers (generally considered less mobile) are in a way *trapped* in their current sector. In this case, the negative industry experience contribution probably captures the effect of those senior workers who are unable to find a new job in another sector.

The results also indicate that there are significant returns to occupational experience in some particular sectors. Ten years of accumulated occupational specific experience for those working in the *energy and water supplies* industry, the *construction* sector and the *distribution, hotels and catering* industry increases log wages by slightly more than 10 percent. The calculated effect for those in the *banking* and *finance* sector is estimated to be lower, around 6 to 8 percent. Despite the fluctuation in the derived returns to occupational experience, the tests support the heterogeneity hypothesis only in the GLS(I) estimates.

General labour market experience, as expected, is found to have a sizable effect across all industries (with the exception of the *energy and water supplies* sector). The calculated wage premia range from 15 percent to 50 percent or above (ten-year effect), and this heterogeneity is partially confirmed by the tests. Finally, although there is some indication of heterogeneity in the returns to employer tenure with positive returns in the *metal goods, engineering and vehicles* industry and the *banking* and *finance* sector, the two heterogeneity tests performed do not support that.

The results reveal important differences between the sectors in the types of work experience that are significant in the wage determination process. In the *energy and water supplies* sector the occupational specificity is the main type of experience that explains individuals wage profiles, with a ten-year effect of 12 percent. In contrast, in the *extraction of minerals and manufacturing of metals* sector, general labour market experience is estimated to have a sizeable effect on wages, higher than that in most other sectors. In the *metal goods, engineering and vehicles* industry employer tenure seems to play some role in wage growth with estimated ten-year returns around 8 percent. General labour market experience is estimated to have around 30 percent effect (ten-years) for

workers in all manufacturing sectors (*metal goods, engineering and vehicles* and *other manufacturing*). Large returns to total working experience are also observed in the *construction* and *distribution, hotel and catering* sectors, where there is evidence of occupational experience effects as well. In the *transport and communication* industry total working experience is again the main determinant of wages from all four types of accumulated experience. Finally, in the *other services* sector general labour market experience and occupational experience are found to make a statistical significant contribution to wage growth.

In conclusion, the findings here clearly imply that assuming homogeneity in the returns to the different work experience variables across occupations and industries is misleading. Notably, occupational experience is found to be significant only for *managers* and *administrators*, those in *professional* and *associated professional* occupations and in *technical* occupations, while industry experience is estimated to make a positive contribution only in the *banking, finance, insurance, business services and leasing* sector. The literature provides some plausible interpretations for these patterns, with Shaw (1987) suggesting from a human capital theory point of view varying levels of intensity in the human capital investment across occupations, and Kwon et *al.* (2004) proposing an internal labour market type of explanation. Although future research in the direction of heterogeneity could be useful, the results presented here are significant in their own merit, because they may help us improve our understanding of the wage determination process and shed more light on issues such as individuals' choices and labour market mobility, and the accumulation of human capital on the job.

6 Conclusion

This paper builds on the recent literature concerning the importance of experience specificity in the wage determination process and extends Kambourov and Manovskii's (2002) study using British data. The BHPS employment history records enable the construction of industry and occupational experience, along with employer-tenure and general labour market experience. Occupational experience is estimated to make an important contribution in determining wages, in line with the findings of the existing literature. The evidence on industry specificity, on the other hand, is not very supportive. The analysis clearly provides evidence that supports the importance of occupational experience especially, and suggests some interesting patterns in the workers' earnings profiles. The findings of this study can help the researcher in analysing the career choices and mobility patterns of workers. What becomes apparent here is that occupational switches are more important than employer or industry switches, since the former are associated with greater earnings losses in the form of forfeited compensation for occupation specific human capital. Moreover, the importance of occupational specificity suggested by the results can be essential to policy makers when formulating policies relating to training schemes, the re-entrance of people into the labour market, and more generally the employability of individuals and the flexibility of the labour market.

The second contribution of the paper is that it assesses whether the estimated work experience related wage premia differ across 1-digit industries and occupations. Indeed the homogeneity hypothesis is rejected. Specifically, the findings outline that industry and occupational experience is important for individuals' earnings in industry sectors and occupations that are mainly

characterised by high-skilled jobs, like *professional* and *managerial* jobs or jobs in the *banking* and *finance* sector.

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Tables

Table 1		
Descriptive Statistics (BHPS: waves 1-11)		
Sample size		
No. of individuals	943	
No. of employer-employee matches	1247	
No. of observations	5244	
Accumulated work experience (years)		
	Mean	Standard deviation
Employer tenure	8.68	(6.70)
General labour market experience	23.66	(10.36)
Industry experience (1-digit)	14.33	(9.97)
Industry experience (2-digit)	11.53	(9.51)
Industry experience (3-digit)	9.94	(9.17)
Occupational experience (1-digit)	12.11	(9.92)
Occupational experience (2-digit)	9.55	(9.17)
Occupational experience (3-digit)	8.71	(8.86)
Distribution of individuals across industry sectors (%)		
Energy & water supplies		4.1
Extraction of minerals, and manufacture of metals, mineral & chemicals		5.0
Metal goods, engineering & vehicles industries		15.5
Other manufacturing industries		13.7
Construction		4.7
Distribution, hotels & catering		11.8
Transport & communication		10.4
Banking & finance		10.6
Other services		24.1
Distribution of individuals across occupations (%)		
Managers & administrators		17.1
Professional occupations		12.0
Associate professional & technical occupations		11.0
Clerical & secretarial occupations		7.5
Craft & related occupations		19.5
Personal & protective service occupations		7.4
Sales occupations		3.9
Plant & machine operatives		16.4
Other occupations		5.2

Note: Derived calculations based on BHPS sample used.

Table 2

Occupation and Industry Switches

	Occupation	*Industry*
Percentage of people who changed at least once occupation/industry		
1-digit level	41.4	29.3
2-digit level	51.2	43.5
3-digit level	55.4	52.6
Percentage of people who changed at least once occupation/industry within an employer match		
1-digit level	36.1	25
2-digit level	46.2	38.3
3-digit level	50.6	47.5
Average number of occupations/industry sectors per individual		
1-digit level	1.6 (2.3)	1.4 (2.2)
2-digit level	1.8 (2.6)	1.6 (2.4)
3-digit level	2 (2.8)	1.9 (2.6)
Average number of occupations/industry sectors per individual within an employer-match		
1-digit level	1.5 (2.3)	1.3 (2.2)
2-digit level	1.7 (2.5)	1.5 (2.3)
3-digit level	1.8 (2.7)	1.7 (2.5)

Note: Numbers into brackets refer to the corresponding average number of occupations/industry sectors for those individuals who changed at least once occupation/industry.

Table 3

Occupation and Industry Mobility

Occupation	***%***	***Industry***	***%***
Managers & administrators	79.2	*Energy & water supplies*	85.6
Professional occupations	82.2	*Extraction of minerals, and manufacture of metals, mineral & chemicals*	77.3
Associate professional & technical occupations	71.8	*Metal goods, engineering & vehicles industries*	85.1
Clerical & secretarial occupations	69.2	*Other manufacturing industries*	88.6
Craft & related occupations	84.7	*Construction*	72.1
Personal & protective service occupations	92.2	*Distribution, hotels & catering*	83
Sales occupations	73	*Transport & communication*	90.9
Plant & machine operatives	80.9	*Banking & finance*	84.9
Other occupations	81.2	*Other services*	92.3
Overall (1-digit level of classification)	80.2	***Overall (1-digit level of classification)***	86.7
Overall (2-digit level of classification)	71.9	***Overall (2-digit level of classification)***	76.9
Overall (3-digit level of classification)	68.2	***Overall (3-digit level of classification)***	69.4

Note: Percentage of individuals who reported an occupation/industry same as their most recent previous stated occupation/industry. Based on the unbalanced panel sample used in the paper.

Table 4

Wage Equation Estimates

GLS(I)		1-digit	2-digit	3-digit	1-digit	2-digit	3-digit	1-digit	2-digit	3-digit
T2	.020*	.021*	.019*	.017*	.017*	.016*	.016**	.018*	.016**	.014**
T5	.043*	.045*	.039*	.036*	.035*	.035*	.035*	.037*	.033**	.030**
T10	.064*	.064*	.055*	.053*	.051*	.052*	.054*	.052*	.046**	.046**
Exp2	.084*	.086*	.082*	.081*	.077*	.080*	.080*	.080*	.079*	.079*
Exp5	.192*	.197*	.187*	.186*	.178*	.184*	.186*	.184*	.181*	.181*
Exp10	.333*	.338*	.323*	.322*	.309*	.320*	.324*	.316*	.314*	.316*
Ind2		-.005	.003	.008				-.007	-1.28e-4	.005
Ind5		-.009	.009	.017***				-.013	.002	.011
Ind10		-.006	.020	.029**				-.012	.012	.022***
Occ2					.013**	.014*	.015*	.014*	.015*	.015*
Occ5					.029*	.030*	.030*	.032*	.031*	.030*
Occ10					.049*	.044*	.039*	.052*	.043*	.039*
Test2 (p-value)								.007	.057	.154
Test5 (p-value)								.006	.067	.194
Test10 (p-value)								.004	.122	.380

Table continued

***Table 4** (continued)*

Wage Equation Estimates

GLS(II)		1-digit	2-digit	3-digit	1-digit	2-digit	3-digit	1-digit	2-digit	3-digit
T2	.013***	.015**	.013***	.011	.011	.011	.010	.013***	.011	.009
T5	.026***	.030**	.025***	.023	.022	.021	.021	.026***	.021	.018
T10	.035***	.038***	.032	.030	.028	.029	.029	.030	.026	.024
Exp2	.084*	.089*	.083*	.082*	.078*	.080*	.081*	.084*	.080*	.080*
Exp5	.193*	.203*	.191*	.189*	.180*	.184*	.187*	.191*	.185*	.185*
Exp10	.332*	.345*	.328*	.325*	.311*	.319*	.323*	.325*	.318*	.320*
Ind2		-.010***	-2.58e-4	.004				-.011***	-.003	.001
Ind5		-.018	.002	.010				-.021***	-.003	.004
Ind10		-.018	.010	.018				-.023	.003	.012
Occ2					.009***	.012**	.013*	.011**	.013*	.014*
Occ5					.022**	.025**	.026*	.025**	.027*	.027*
Occ10					.037*	.036*	.032*	.041*	.037*	.033*
Test2 (p-value)								.007	.043	.093
Test5 (p-value)								.006	.051	.122
Test10 (p-value)								.005	.094	.281

Notes: **T2**, **T5**, **T10** the calculated two, five, and ten-year effect of employer-tenure. Similarly for general labour market experience (**Exp**), industry experience (**Ind**) and occupational experience (**Occ**). *** significant at 10%; ** significant at 5%; * significant at 1%. In GLS: (I), the observation unit is the individual, (II) the observation unit is the individual working for a particular employer. **Test 2** null hypothesis is that Ind2 is equal to Occ2 effect. Similarly, for **Test5** and **Test10**.

Table 5

Heterogeneity in the Human Capital Wage Premia Across Occupations

	GLS(I)				GLS(II)			
	T10	Exp10	Ind10	Occ10	T10	Exp10	Ind10	Occ10
Managers & administrators	.023	.668*	-.049	.183*	-.022	.648*	-.050	.196*
Professional occupations	.013	.298*	.024	.160*	-.002	.171	.017	.148*
Associate professional & technical occupations	-.012	.275*	-.028	.114*	-.034	.265**	-.052	.098**
Clerical & secretarial occupations	.145**	.399*	-.014	.009	.094	.440*	-.007	-.003
Craft & related occupations	.137*	.341*	.014	-.057	.135*	.387*	-.004	-.074***
Personal & protective service occupations	.142**	-.148	.103	-.026	.122***	-.117	.070	-.032
Sales occupations	.173**	.625*	-.077	.068	.147***	.634*	-.064	.092
Plant & machine operatives	.023	.279*	-.033	-.039	.002	.307*	-.037	-.060
Other occupations	-.013	.097	.022	-.093	-.062	.157	-.022	-.108
Test 1 (p-value)	.158	.001	.640	.000	.207	.003	.804	.000
Test 2 (p-value)	.046	.002	.645	.000	.025	.004	.839	.000

Notes: **T10**, **Exp10**, **Ind10** and **Occ10** are the calculated ten-year effect of employer-tenure, general labour market experience, industry experience and occupational experience, respectively. *** significant at 10%; ** significant at 5%; * significant at 1%. In GLS: (I), the observation unit is the individual, (II) the observation unit is the individual working for a particular employer. **Test1** null hypothesis: interaction terms are all equal. **Test2** null hypothesis: interaction terms are all equal to zero.

Table 6

Heterogeneity in the Human Capital Wage Premia Across Industries

	GLS(I)				GLS(II)			
	T10	Exp10	Ind10	Occ10	T10	Exp10	Ind10	Occ10
Energy & water supplies	.077	-.077	-.090	.117***	.045	-.054	-.110	.123***
Extraction of minerals, and manuf.of metals etc.	.029	.500*	.037	.040	-.015	.502*	.083	.040
Metal goods, engineering & vehicles industries	.069***	.370*	-.126*	-.022	.090**	.277*	-.133*	-.019
Other manufacturing industries	-.039	.254*	.023	.009	-.015	.278*	-.003	.003
Construction	.122	.472*	-.026	.112***	.069	.470*	-.046	.092
Distribution, hotels & catering	.048	.453*	-.073	.134*	.003	.618*	-.107**	.124*
Transport & communication	.090	.394*	-.100***	.060	.034	.372*	-.098***	.026
Banking & finance	.105**	.298*	.082***	.059	.079	.247**	.092***	.056
Other services	.035	.150***	.041	.083*	.011	.186**	.021	.062**
Test 1 (p-value)	.446	.209	.037	.063	.706	.018	.011	.121
Test 2 (p-value)	.522	.057	.024	.067	.743	.009	.001	.158

Notes: **T10**, **Exp10**, **Ind10** and **Occ10** are the calculated ten-year effect of employer-tenure, general labour market experience, industry experience and occupational experience, respectively. *** significant at 10%; ** significant at 5%; * significant at 1%. In GLS: (I), the observation unit is the individual, (II) the observation unit is the individual working for a particular employer. **Test1** null hypothesis: interaction terms are all equal. **Test2** null hypothesis: interaction terms are all equal to zero.

Appendix

Construction of Employer-Tenure variable

The employer tenure variable refers to the amount of time an individual has spent with his current employer until the date of the interview. The variable is measured in months and is constructed only for the individuals who were employed during the time of interview.

The construction of the employment variable is based on three main records, the wave-on-wave job history record (***WJOBHIST***[17]), the ***Wave 3*** lifetime employer history record (***CLIFEJOB***) and the ***Wave 2*** lifetime employment status history record (***BLIFEMST***). The ***WJOBHIST*** record contains information on the employment history over the period between the 1st September of the year before the individual was interviewed and the date of interview of each wave. These records exist only for individuals whose current labour force began sometime during the period that the records cover. ***CLIFEJOB*** contains information on employer spells with start and end dates for the individual's employment prior to 1st September 1990. The record is restricted to respondents that were interviewed at ***Wave 2*** and had another (full-time or part-time) paid job (with different employer than the one in their previous employment spell) at ***Wave 3*** that lasted more than one month. The ***BLIFEMST*** record contains information about employment status spells, rather than changes in employers, covering the period since the respondent first left full-time education. The data collection was unrestricted, so all

[17] The first letter (W) in the name of the job history record refers to the particular wave. Therefore, for the ***Wave 2*** the name of the record would be ***BJOBHIST*** and similarly for the other waves.

respondents at ***Wave 2*** were asked questions concerning their lifetime employment activities.

The methodology followed for the construction of the employer-tenure variable is quite similar for all the waves. However, there is an additional step included to the succeeding ***Wave 1*** remaining BHPS waves. For illustration reasons, I will focus on the description of the tenure variable in ***Waves 1*** and ***2***, for the rest of the BHPS waves the process is exactly the same with the one followed for the second wave.

In order to identify the beginning of an employment spell with a particular employer, the respondent should either not be working previously, or specifically state that he currently works for a different employer than his previous one. Starting now with ***Wave 1***, the construction of employer-tenure is based on five steps, in every step the sample contains only individuals whose tenure variable has not been constructed in one of the previous steps.

The first step is based on the ***AJOBHIST*** record. The individuals of concern are:

(a) Those who were either self-employed or employed with a different employer in the most recent spell (spell closest to the date of ***Wave 1*** interview) and were not working with the same employer in the previous spell. Or,

(b) Those who were employed with the same employer at the most recent spell but were employed with a different employer or self-employed in the exact previous spell, so that one can identify the beginning of the employment spell with the current employer. In the case where the individual was working for the same employer at the last two most recent

spells, I check whether he was working at a different employer or was self-employed during the spell before these two.

Employer-tenure is defined as the period between the beginning of the employment spell at the most recent spell or, the exact previous one and the date ***Wave 1*** interview took place, for the two groups of individuals described above, respectively.

The second step is based on the ***WINDRESP*** records of the rest of the BHPS waves. Starting with the ***BINDRESP*** record, the analysis is focused on the individuals whose current employment status in ***Wave 2*** started before or exactly when current economic activity reported in ***Wave 1*** started. For those individuals employer-tenure is calculated as the period between the beginning of the current economic activity in ***Wave 2*** and the date of the ***Wave 1*** interview. The process described above is repeated using alternatively the rest of the ***WINDRESP*** records.

For the next step, the ***BLIFEMST*** record is used. The individuals of interest here are those, whose start of employment spell matches exactly with the date current employment began in ***Wave 1***. In addition the respondents should be either full-time or part-time employed at the spell of interest and not full-time or part-time employed in the exactly previous spell, so that one can identify the beginning of the employment spell with the current employer. The employer-tenure is estimated as the period between the beginning of current employment in ***Wave 1*** and the date of ***Wave 1*** interview.

In the forth step, there are three alternative methods used. The relevant information used, in all methods described below, for the calculation of the employer-tenure is taken from the ***CLIFEJOB*** record. Starting with the first

method, the analysis focuses on the individuals whose employment spell, as reported in ***CLIFEJOB*** record, started exactly when current employment in ***Wave 1*** started. In the case where seasons instead of months are stated in the date employment began, the individuals are excluded from this method. Employer-tenure here is simply the period over the beginning of the employment spell of interest from the ***CLIFEJOB*** record and the date of ***Wave 1*** interview.

In the second method employed, the criteria are relaxed. Here the focus is on the individuals whose current employment spell in ***Wave 1*** started sometime between two consecutive employment spells as reported in the ***CLIFEJOB*** record. In addition when seasons are stated, they are replaced with months[18]. For those individuals, employer-tenure is constructed by calculating the months between the beginning of their current employment status and the date of ***Wave 1*** interview.

Finally in the third method used, the criterion for the selection of the individuals of interest is that the date of ***Wave 1*** interview must fall between the beginning and the end of an employment spell in the ***CLIFEJOB*** record. As before, seasons are proxied with months. The acquired tenure then is considered to be the period over the beginning of the employment spell of interest from the ***CLIFEJOB*** record and the date the individual was interviewed in ***Wave 1***.

In the last step, I look whether the current employment status reported in the succeeding waves began before the date ***Wave 1*** interview took place. More

[18] *Winter* is replaced with January, *Spring* with April, *Summer* with July and *Autumn* with October.

particularly, starting with ***Wave 2,*** I look for individuals whose employment status in ***Wave 2*** started before the ***Wave 1*** date of interview and who were either full-time or part-time employed in both ***Waves 1*** and **2**. Employer-tenure is defined as the period between the beginning of the ***Wave 2*** current employment status and the date of ***Wave 1*** interview (***ADOIM***). The same process is repeated for the other remaining waves.

The methodology described above is used in order to construct the employer-tenure variable for ***Wave 1***. For the remaining waves the process is quite similar, with the addition of one step at the beginning. More specifically, initially I examine whether the current employment status of the wave of interest began before or during the date the interview of the previous wave took place. For example, when constructing the tenure variable for ***Wave 2***, I check whether the current employment status began before or during the ***Wave 1*** interview took place. If this is the case, then tenure is simply constructed by estimating the period between the ***Wave 1*** and ***Wave 2*** date of interview and adding that to the employer tenure of the previous wave (***Wave 1***). After this step, the methodology followed is exactly the same as the one described above for ***Wave 1***.

Construction of General Labour Market Experience

General labour market experience measures the total work experience an individual has accumulated as a full-time or part-time employee in the labour market up to the time of the BHPS interview. For the construction of the actual work experience I start with ***Wave 2***, because in that year a lifetime labour market experience survey was conducted (***BLIFEMST*** record). Therefore the second wave of the BHPS is the basis for generating the general

labour market experience for the rest of the waves. Consequently actual experience variable is available only for individuals that had left full-time education at the time ***Wave 2*** survey was conducted. Below there is a description of the three main steps followed in order to construct the actual labour market experience. In all the steps described below, when seasons are reported instead of months they are proxied with months in the same way as I do for the construction of the employer-tenure variable.

The first step is focused on the construction of the experience variable in ***Wave 2***, based on the ***BLIFEMST*** record. The main variables used from that record were the length of employment history spell in order to identify the employment spells, and the lifetime employment history status to characterise them. First, individuals with missing information on these two variables are dropped from the sample. Then I simply summed up the spells by category (e.g. full-time employed) for each individual separately. This way I constructed a variable in ***Wave 2*** that corresponds to the actual experience an individual has obtained up to the time of ***Wave 2*** interview.

In the second step, I return to the first wave of the BHPS and construct the experience variable for that wave. The basic idea behind the process followed here is first to identify the employment spells during the period between ***Wave 1*** and ***2*** interviews. Then, by subtracting these spells from the ***Wave 2*** actual experience variable I can estimate the actual labour market experience of the individuals in ***Wave 1***. Records ***BLIFEMST***, ***AINDRESP*** and ***BINDRESP*** were used for the construction of the experience variable in the first wave.

The general labour market experience of the remaining waves is constructed in the third step. The methodology followed is the same for each wave,

therefore for illustration reasons I will focus on the process of construction the experience variable for ***Wave 3***. The sample is divided into three sub-samples:

(a) The individuals from record ***CJOBHIST*** whose last change in labour status began before the ***Wave 2*** interview. More specifically the first sub-sample includes those individuals whose most recent change in labour status started on September 1992 or before, or whose last employment spell started after September 1992 but before the date of ***Wave 2*** interview.

(b) The individuals from record ***CJOBHIST*** whose last change in labour status began at the time of the ***Wave 2*** interview or afterwards. In particular individuals whose most recent employment spell started after September 1992 and after the year of ***Wave 2*** interview, or whose last change in labour status occurred after September 1992 and after or during the date of ***Wave 2*** interview.

(c) The remaining of the individuals from ***CINDRESP*** record.

For all the groups of individuals the main steps in the construction of the experience variables can be summarised in the following. First, I keep the individuals of interest. Then I identify the employment spells and characterise them. Sum up the spells by category for each individual. Finally, add them to the experience variables of the previous wave, in our case ***Wave 2***, to get the experience at the date of interview of the current wave.

For the first group of individuals the construction of employment spells is based on the dates labour force spells ended and the dates of ***Wave 2*** and ***3*** interview. Spells can be either the period between the ***Wave 2*** interview and the end of labour status (***spell 1***), or the period between the end of labour status and ***Wave 3*** interview, or ***Wave 2*** interview and ***Wave 3*** interview (***spell 2***). The characterisation of ***spell 1*** is based on information from ***CJIBHIST*** record. If the individuals have responded that they were in

different job but with the same employer characterisation is based on the ***BINDRESP*** record. Similarly, for ***spell 2*** the identification is based on information from ***CINDRESP*** record.

Continuing with the second sub-sample of individuals, the construction of employment spells is based on the dates employment spell began and ended and on the dates of ***Wave 2*** and ***3*** interview. The constructed spells are divided into three types:

(a) Those covering the period between ***Wave 2*** interview and the end of a labour force spell, for the least recent spell (***spell 1***).

(b) Those for the period between the end of a labour force spell and ***Wave 3*** interview, for the most recent spell (***spell 2***). And finally,

(c) Those covering the period between the beginning and end of a labour force spell, for all the spells between the least and the most recent one (***spell 3***).

The characterisation of ***spell 1*** is based on information from the ***BINDRESP*** record, while labour force spells belonging in ***spell 2*** are characterised based on ***CINDRESP*** record. ***Spell 3*** similarly is categorised using information from the ***CJIBHIST*** record. If individuals had responded that they are in a different job but with the same employer then the identification is made using the information from the exactly previous spell from the one referred. Individuals whose labour status cannot be identified are excluded from the sample.

Finally, the third group contains the remaining of the individuals. The spells constructed are simply the period between the ***Wave 2*** and ***3*** interviews, and their characterisation is made using information from the ***CINDRESP*** record.

The process described above is repeated for the rest of the BHPS waves in order to construct the general labour market experience variable.

Construction of Industry and Occupational Experience Variable

The construction of both industry and occupational experience is quite similar. Therefore here I describe the steps followed in order to construct the industry experience. One should be able to derive occupational experience as well by simply repeating this process.

The starting point (***1st step***) on the construction of the industry experience is ***Wave 3***, where retrospective information on respondents' employment history is collected (***CLIFEJOB***). The construction of industry experience is based on this record since it is the only lifetime employment status history record in BHPS that provides information on the industry respondents were employed. Therefore, industry experience can be constructed only for those individuals included in the ***CLIFEJOB*** record.

First, I restrict my attention to those who reported being either part-time or full-time employees, excluding the self-employed respondents. Then I calculate the employment spells based on the recorded length of job history spells, or based on the information about the beginning and the end of these spells. When seasons are reported, they are replaced with months[19]. Information on the industry is collected when reported. In the case of missing information, I check the ***CINDRESP*** record, only though when the starting date of employment matches between these two records, or when the current

[19] *Winter* is replaced with January, *Spring* with April, *Summer* with July and *Autumn* with October.

job in ***CINDRESP*** began before the employment spell of interest in the ***CLIFEJOB***. Alternatively, I gather this information from the following waves. The criterion is that the starting date of the reported current employment spell should either coincide or be before the date the spell in ***CLIFEJOB*** began. Finally, I check whether the starting date current job in ***Waves 1*** and ***2*** matches exactly with the date the employment spell in ***CLIFEJOB*** has began, since I can get information on industry from these waves. After constructing the employment spells and collecting the related information on industry, I add up the spells by industry for each respondent separately in order to construct the industry experience and keep the most recent one, since individuals may be repeated in the sample. In the next step, I use the already calculated industry experience as the basis for the construction of industry experience in ***Wave 1***.

The industry experience variable constructed up to this point refers to employment spells of the respondents' labour market history, where the last reported employment spell began before the 1st September 1990 and may have terminated either before or after the date of ***Wave 1*** interview. Therefore I need to identify which is the case, for each individual, and based on this information and the already constructed variable above to measure the industry experience up to the ***Wave 1*** interview (***2nd step***). Based on the ***AJOBHIST*** record, which contains information from the employment history over the period from 1st September of the year before to the date of interview, the sample is divided into four groups, according to the individuals' status type of the last job history record. This is quite informative on what to expect in the following waves.

***Not Last Spell*:**

- If the most recent employment spell (in a different job but with the same employer, or with a different employer) in ***AJOBHIST*** ended

when the last employment spell in ***CLIFEJOB*** terminated, or afterwards but before the ***Wave 1*** interview, then the industry-experience variable in ***Wave 1*** is the one calculated in the ***1st step***.

- If it ended after the ***Wave 1*** interview, then the period between the end of the last employment spell (in ***CLIFEJOB*** record) and the date of interview is subtracted from the measured above variable.
- If the last employment spell in ***CLIFEJOB*** ended before the most recent one in ***AJOBHIST***, then the duration of any additional employment spells from the latter record is included in the variable of the ***1st step*** and that gives the ***Wave 1*** industry-experience.

Last Job Ever:

- If the most recent job spell in ***AJOBHIST*** did not end after the date the last employment status in ***CLIFEJOB*** ended or the ***Wave 1*** interview, the industry-experience in that wave coincides with the one already measured above.
- Otherwise, the duration between the date of interview and the termination of the ***CLIFEJOB*** last job spell should be subtracted from the variable of the ***1st step***.

Began After 1.9.90

- If at the most recent employment spell in ***AJOBHIST*** the end date is before or at the same time that the last spell in ***CLIFEJOB*** began, then ***Wave 1*** industry experience is equal to the one already calculated after subtracting the duration of this last spell.
- If the beginning though of the most recent spell in ***AJOBHIST*** matches with the beginning of the last spell in ***CLIFEJOB***, then industry experience in ***Wave 1*** should be equal to the already calculated

industry experience minus the period between the ***Wave 1*** and ***3*** interviews.

Present Job (Started) Before 1.9.90

- Similar to the previous case.

For the remained individuals, the construction of industry-experience is based on ***AINDRESP*** record, the main ***Wave 1*** record. The sample is divided into three main groups according to their employment status:

1. If individuals not currently employed, then industry-experience is equal to the one calculated in the ***1st step***.
2. If the beginning of the current employment in ***Wave 1*** matches with the beginning of the last spell in ***CLIFEJOB***, then industry experience in this wave is equal to the one already estimated, minus the duration of this last spell, plus the period between the beginning of the current job and the ***Wave 1*** interview.
3. The last group of interest contains those individuals whose current job began after the date the last spell in ***CLIFEJOB*** started. There are six sub-cases considered here. If the last spell in ***CLIFEJOB***:
    - Finished after the ***Wave 1*** interview, then industry experience is equal to the industry experience from the ***1st step***, minus the last spell, plus the period between the end of this last spell and the ***Wave 1*** interview.
    - Finished before or during the beginning of the current employment in ***Wave 1***, then industry experience is equal to the calculated one, plus the period between the start of current job and the ***Wave 1*** interview.
    - Started after the beginning of the current employment, but before the date of interview, then ***Wave 1*** industry experience is equal to

the variable from the ***1st step***, minus this last spell, plus the period between the beginning of this last spell and the ***Wave 1*** interview.

- Ended before or during the ***Wave 1*** interview, then industry experience is equal to the one measured in the ***1st step***, plus the period between the end of this last spell and the date of interview.
- Ended after the ***Wave 1*** interview, then industry experience is equal to the industry experience based on the ***1st step***, minus the period between the date of interview and the end of this last spell.

For the remained individuals, industry experience is equal to the one estimated before, minus the last spell in that record, plus the period between the start of current job in ***Wave 1*** and the date of interview. The construction of the ***Wave 1*** industry experience is completed here. The calculation of industry experience for the following waves is based on this one.

The methodology employed for the construction of the industry experience for the remaining waves (***3rd step***) is the same for all of them. Therefore, I only discuss how to proceed on ***Wave 2*** and the analysis should be exactly the same for the rest of the waves.

Focusing first on the ***BJOBHIST*** record, the individuals of interest here are those in a different job but with the same employer or those working full-time or part-time for a different employer. The first group of respondents includes those, whose least recent employment spell in ***BJOBHIST*** began before and ended after or during the ***Wave 1*** date of interview. Industry experience is equal to the one in ***Wave 1*** plus the period between the ***Wave 1*** interview and the end of this employment spell, the duration of the following spells of employment and the period between the beginning of the current employment spell, reported in ***BINDRESP***, and the date of ***Wave 2*** interview.

The second group contains the respondents who did not report any employment spell in ***BJOBHIST***. For those individuals, industry experience is equal to the one in ***Wave 1*** if they reported not employed as well in ***BINDRESP***. Otherwise in the case of employment, it should be equal to the ***Wave 1*** industry experience plus the period between the beginning of their current employment and the ***Wave 2*** interview. For the remained individuals in record ***BINDRESP***, industry experience is equal to the ***Wave 1*** industry experience plus the period between ***Waves 1*** and ***2*** interviews if they reported employed and equal to the ***Wave 1*** industry experience if they were not currently working. The construction of industry experience for the remained waves is exactly the same as the one described above.

Occupational experience is constructed exactly as industry experience. The spells are identified in a similar pattern and the only difference is that instead of using information on the industry individuals are working in, here I use the occupation of the individual reported in each employment spell, in order to estimate the period of time spent in each occupation.

Description of Occupations

The occupations are classified according to the *Standard Occupational Classification 1990* (SOC), which is broken down into three levels; the *major* groups (1-digit level), the *minor* groups (2-digit level) and the constituent *unit* groups (3-digit level). In the sample used in the paper there are 266 *unit* groups that are allocated to 74 *minor* groups and to 9 *major* groups. Below there is a full list of the occupational groupings observed in the sample.

1 Managers & administrators

10 General managers & administrators in national & local Government, large companies & organisations
- 102 Local government officers (administrative & executive functions)
- 103 General administrators; national government (HEO to Senior Principal/Grade 6)

11 Production managers in manufacturing, construction, mining & energy industries
- 110 Production, works & maintenance managers
- 111 Managers in building & contracting
- 113 Managers in mining & energy industries

12 Specialist managers
- 120 Treasurers & company financial managers
- 121 Marketing & sales managers
- 122 Purchasing managers
- 123 Advertising & public relations managers
- 124 Personnel, training & industrial relations managers
- 126 Computer systems & data processing managers
- 127 Company secretaries

13 Financial institution & office managers, civil service executive officers
- 130 Credit controllers
- 131 Bank, Building Society & Post Office managers (except self-employed)
- 132 Civil Service executive officers
- 139 Other financial institution & office managers nec

14 Managers in transport & storing
- 140 Transport managers
- 141 Stores controllers
- 142 Managers in warehousing & other materials handling

15 Protective service officers
- 153 Fire service officers (station officer & above

16 Managers in farming, horticulture, forestry & fishing
- 160 Farm owners & managers, horticulturists

17 Managers & proprietors in service industries
- 170 Property & estate managers
- 171 Garage managers & proprietors

173 Hotel & accommodation managers
174 Restaurant & catering managers
175 Publicans, innkeepers & club stewards
176 Entertainment & sports managers
177 Travel agency managers
178 Managers & proprietors of butchers & fishmongers
179 Managers & proprietors in service industries nec

19 Managers & administrators nec
190 Officials of trade associations, trade unions, professional bodies & charities
191 Registrars & administrators of educational establishments
199 Other managers & administrators nec

2 Professional occupations

20 Natural scientists
200 Chemists
201 Biological scientists & biochemists
209 Other natural scientists nec

21 Engineers & technologists
210 Civil, structural, municipal, mining & quarry engineers
211 mechanical engineers
212 Electrical engineers
213 Electronic engineers
214 Software engineers
215 Chemical engineers
216 Design & development engineers
217 Process & production engineers
218 Planning & quality control engineers
219 Other engineers & technologists nec

22 Health professionals
220 Medical practitioners
224 Veterinarians

23 Teaching professionals
230 University & polytechnic teaching professionals
231 Higher & further education teaching professionals
232 Education officers, school inspectors
233 Secondary (& middle school deemed secondary) education teaching professionals
234 Primary (& middle school deemed primary) & nursery education teaching professionals

24 Legal professionals
242 Solicitors

25 Business & financial professionals
250 Chartered & certified accountants
251 Management accountants
252 Actuaries, economists & statisticians
253 Management consultants, business analysts

26 Architects, town planners &surveyors
260 Architects
261 Town planners
262 Building, land, mining & 'general practice' surveyors

29 Professional occupations nec
292 Clergy
293 Social workers, probation officers

3 Associate professional & technical occupations

30 Scientific technicians
300 Laboratory technicians
301 Engineering technicians
302 Electrical/electronic technicians
303 Architectural & town planning technicians
304 Building & civil engineering technicians
309 Other scientific technicians nec

31 Draftspersons, quantity & other surveyors
310 Draughtspersons
311 Building inspectors
312 Quantity surveyors

32 Computer analyst/programmers
320 Computer analyst/programmers

33 Ship & aircraft officers, air traffic planners & controllers
330 Air traffic planners & controllers
331 Aircraft flight deck officers
332 Ship & hovercraft officers

34 Health associate professionals
340 Nurses
342 Medical radiographers
343 Physiotherapists
346 Medical technicians, dental auxiliaries
348 Environmental health officers

35 Legal associate professionals
350 Legal service & related occupations

36 Business & financial associate professionals
360 Estimators, valuers
361 Underwriters, claims assessors, brokers, investment analysts
362 Taxation experts
363 Personnel & industrial relations officers
364 Organisation & methods & work study officers

37 Social welfare associate professionals
370 Matrons, houseparents
371 Welfare, community & youth workers

38 Culture, media and sports occupations
380 Authors, writers, journalists
381 Artists, commercial artists, graphic designers
384 Actors, entertainers, stage managers, producers & directors
386 Photographers, camera, sound and video equipment operators
387 Professional athletes, sports officials

39 Associate professional & technical occupations nec
390 Information officers
391 Vocational & industrial trainers
392 Careers advisers & vocational guidance specialists

394 Inspectors of factories, utilities & trading standards
395 Other statutory & similar inspectors nec
396 Occupational hygienists & safety officers (health & safety)
399 Other associate professional & technical occupations nec

4 Clerical & secretarial occupations

40 Administrative/clerical officers & assistants in civil service & local government
400 Civil Service administrative officers & assistants
401 Local government clerical officers & assistants

41 Numerical clerks & cashiers
410 Accounts & wages clerks, book-keepers, other financial clerks
411 Counter clerks & cashiers
412 Debt, rent & other cash collectors

42 Filing & records clerks
420 Filing, computer & other records clerks (inc. legal conveyancing)
421 Library assistants/clerks

43 Clerks (not otherwise specified)
430 Clerks (nec)

44 Stores & despatch clerks, storekeepers
440 Stores, despatch & production control clerks
441 Storekeepers & warehousemen/women

46 Receptionists, telephonists & related occupations
460 Receptionists
463 Radio & telegraph operators, other office communication system operators

49 Clerical & secretarial occupations nec
490 Computer operators, data processing operators, other office machine operators

5 Craft & related occupations

50 Construction trades
503 Glaziers
505 Scaffolders, stagers, steeplejacks, riggers
507 Painters & decorators
509 Other construction trades nec

51 Metal machining, fitting &instrument making trades
510 Centre, capstan, turret & other lathe setters & setter-operators
511 Boring & drilling machine setters & setter-operators
512 Grinding machine setters & setter-operators
513 Milling machine setters & setter-operators
514 Press setters & setter-operators
515 Tool makers, tool fitters & markers-out
516 Metal working production & maintenance fitters
517 Precision instrument makers & repairers
518 Goldsmiths, silversmiths, precious stone workers
519 Other machine tool setters & setter-operators nec (inc CNC setter-operators)

52 Electrical/electronic trades
520 Production fitters (electrical/electronic)
521 Electricians, electrical maintenance fitters

522 Electrical engineers (not professional)
523 Telephone fitters
524 Cable jointers, lines repairers
525 Radio, TV & video engineers
526 Computer engineers, installation & maintenance
529 Other electrical/electronic trades nec

53 Metal forming, welding & related trades

531 Moulders, core makers, die casters
532 Plumbers, heating & ventilating engineers & related trades
533 Sheet metal workers
534 Metal plate workers, shipwrights, riveters
537 Welding trades

54 Vehicle trades

540 Motor mechanics, auto engineers (inc. road patrol engineers)
541 Coach & vehicle body builders
542 Vehicle body repairers, panel beaters
544 Tyre & exhaust fitters

55 Textiles, garments & related trades

550 Weavers
551 Knitters
552 Warp preparers, bleachers, dyers & finishers
554 Coach trimmers, upholsterers & mattress makers
555 Shoe repairers, leather cutters & sewers, footwear lasters, makers & finishers, other leather making & repairing
559 Other textiles, garments & related trades nec

56 Printing & related trades

560 Originators, compositors & print preparers
561 Printers
562 Bookbinders & print finishers
563 Screen printers
569 Other printing & related trades nec

57 Woodworking trades

570 Carpenters & joiners
571 Cabinet makers
573 Pattern makers (moulds)

58 Food preparation trades

580 Bakers, flour confectioners
581 Butchers, meat cutters
582 Fishmongers, poultry dressers

59 Other craft &related occupations nec

590 Glass product & ceramics makers
591 Glass product & ceramics finishers & decorators
592 Dental technicians
594 Gardeners, groundsmen/groundswomen
596 Coach painters, other spray painters
597 Face trained coalmining workers, shotfirers & deputies
598 Other machinery mechanics
599 Other craft & related occupations nec

6 Personal & protective service occupations

60 NCOs & other ranks, armed forces

600 NCOs & other ranks, UK armed forces

61 Security & protective service occupations

610 Police officers (sergeant & below)

611 Fire service officers (leading fire officer & below)

612 Prison service officers (below principal officer)

613 Customs & excise officers, immigration officers (customs: below chief preventive officer; excise: below surveyor)

615 Security guards & related occupations

62 Catering occupations

620 Chefs, cooks

621 Waiters, waitresses

622 Bar staff

63 Travel attendants & related occupations

631 Railway station staff

64 Health & related occupations

640 Assistant nurses, nursing auxiliaries

641 Hospital ward assistants

642 Ambulance staff

644 Care assistants & attendants

65 Childcare & related occupations

652 Educational assistants

67 Domestic staff &related occupations

672 Caretakers

69 Personal & protective service occupations nec

699 Other personal & protective service occupations nec

7 Sales occupations

70 Buyers, brokers & related agents

700 Buyers (retail trade)

701 Buyers & purchasing officers (not retail)

71 Sales representatives

710 Technical & wholesale sales representatives

719 Other sales representatives nec

72 Sales assistants & check-out operators

720 Sales assistants

721 Retail cash desk & check-out operators

722 Petrol pump forecourt attendants

73 Mobile market & door-to-door salespersons & agents

731 Roundsmen/women & van salespersons

79 Sales occupations nec

790 Merchandisers

791 Window dressers, floral arrangers

792 Telephone salespersons

8 Plant & machine operatives

80 Food, drink & tobacco process operatives

800 Bakery & confectionery process operatives
801 Brewery & vinery process operatives
802 Tobacco process operatives
809 Other food, drink & tobacco process operatives nec

81 Textiles & tannery process operatives

812 Spinners, doublers,twisters
814 Other textiles processing operatives

82 Chemicals, paper, plastics & related process operatives

820 Chemical, gas & petroleum process plant operatives
821 Paper, wood & related process plant operatives
822 Cutting & slitting machine operatives (paper products etc)
823 Glass & ceramics furnace operatives, kilnsetters
824 Rubber process operatives, moulding machine operatives, tyre builders
825 Plastics process operatives,moulders & extruders
829 Other chemicals, paper, plastics & related process operatives nec

83 Metal making &treating process operatives

834 Electroplaters, galvanisers, colour coaters
839 Other metal making & treating process operatives nec

84 Metal working process operatives

840 Machine tool operatives (inc CNC machine tool operatives)
841 Press stamping & automatic machine operatives
843 Metal dressing operatives

85 Assemblers/lineworkers

850 Assemblers/lineworkers (electrical/electronic goods)
851 Assemblers/lineworkers (vehicles & other metal goods)
859 Other assemblers/lineworkers nec

86 Other routine process operatives

860 Inspectors, viewers & testers (metal & electrical goods)
861 Inspectors, viewers, testers & examiners (other manufactured goods)
862 Packers, bottlers, canners, fillers
863 Weighers, graders, sorters
864 Routine laboratory testers
869 Other routine process operatives nec

87 Road transport operatives

871 Road transport depot inspectors & related occupations
872 Drivers of road goods vehicles
873 Bus & coach drivers
874 Taxi, cab drivers & chauffeurs
875 Bus conductors

88 Other transport & machinery operatives

881 Rail transport inspectors, supervisors & guards
882 Rail engine drivers & assistants
885 Mechanical plant drivers & operatives (earth moving & civil engineering)
887 Fork lift & mechanical truck drivers
889 Other transport & machinery operatives nec

89 Plant & machine operatives nec

891 Printing machine minders & assistants

892 Water & sewerage plant attendants
893 Electrical, energy, boiler & related plant operatives & attendants
896 Construction & related operatives
897 Woodworking machine operatives
898 Mine (excluding coal) & quarry workers
899 Other plant & machine operatives nec

9 Other occupations

90 Other occupations in agriculture, forestry & fishing

902 All other occupations in farming & related
904 Forestry workers

91 Other occupations in mining & manufacture

910 Coal mine labourers
911 Labourers in foundries
912 Labourers in engineering 7 allied trades
913 Mates to metal/electrical & related fitters
919 Other labourers in making & processing industries nec

92 Other occupations in construction

921 Mates to building trades workers
922 Rail construction & maintenance workers
923 Road construction & maintenance workers
929 Other building & civil engineering labourers nec

93 Other occupations in transport

931 Goods porters
933 Refuse & salvage collectors

94 Other occupations in communication

940 Postal workers, mail sorters
941 Messengers, couriers

95 Other occupations in sales & service

950 Hospital porters
952 Kitchen porters, hands
953 Counterhands, catering assistants
954 Shelf fillers
955 Lift & car park attendants
957 Road sweepers
958 Cleaners, domestics

99 Other occupations nec

990 All other labourers & related workers
999 All others in miscellaneous occupations nec

Description of Industry Sectors

The industries are classified according to the *Standard Industry Classification 1990* (SIC), which is broken down into four levels; the *divisions* (1-digit level), the *classes* (2-digit level), the *groups* (3-digit level), and the *activity units* (4-digit level). For the purpose of the analysis information only up to the 3-digit level is used. In the sample used there are 195 *groups* that are arranged into 57 *classes* and 9 *divisions*. Below there is a full list of the industry sectors observed in the sample.

1 Energy & water supplies
- 11 Coal extraction & manufacture of solid fuels
  - 111 coal extraction & manufacture of solid fuels
- 13 Extraction of mineral oil & natural gas
  - 130 extraction of mineral oil & natural gas
- 14 Mineral oil processing
  - 140 mineral oil processing
- 15 Nuclear fuel production
  - 152 nuclear fuel production
- 16 Production & distribution of electricity, gas & other forms of energy
  - 161 production & distribution of electricity
  - 162 public gas supply
  - 163 production & distribution of other forms of energy
- 17 Water supply industry
  - 170 water supply industry

2 Extraction of minerals & ores other than fuels; manufacture of metals, mineral products & chemicals
- 22 Metal manufacturing
  - 221 iron & steel industry
  - 222 steel tubes
  - 223 drawing, cold rolling & cold forming of steel
  - 224 non-ferrous metals industry
- 23 Extraction of minerals not elsewhere specified
  - 231 extraction of stone, clay, sand & gravel
- 24 Manufacture of non-metallic mineral products
  - 242 cement, lime & plaster
  - 243 building products of concrete, cement or plaster
  - 245 working of stone & other non-metallic minerals nec
  - 246 abrasive products
  - 247 glass & glassware
  - 248 refractory & ceramic goods

25 Chemical industry
- 251 basic industrial chemicals
- 255 paints, varnishes & printing ink
- 256 specialised chemical products mainly for industrial & agricultural purposes
- 257 pharmaceutical products
- 258 soap & toilet preparations
- 259 specialised chemical products mainly for household & office use

3 Metal goods, engineering & vehicles industries

31 Manufacture of metal goods not elsewhere specified
- 311 foundries
- 312 forging, pressing & stamping
- 313 bolts, nuts etc; springs; non precision chains; metals treatment
- 314 metal doors, windows etc
- 316 hand tools & finished metal goods

32 Mechanical engineering
- 320 industrial plant & steelwork
- 321 agricultural machinery & tractors
- 322 metal-working machine tools & engineer's tools
- 324 machinery for the food, chemical & related industries; process engineering contractors
- 325 mining machinery, construction & mechanical handling equipment
- 326 mechanical power transmission equipment
- 327 machinery for the printing, paper, wood, leather, rubber, glass & related industries; laundry & dry cleaning equipment
- 328 other machinery & mechanical equipment
- 329 ordnance, small arms & ammunition

33 Manufacture of office machinery & data processing equipment
- 330 manufacture of office machinery & data processing equipment

34 Electrical & electronic engineering
- 341 insulated wires & cables
- 342 basic electrical equipment
- 343 electrical equipment for industrial use & batteries & accumulators
- 344 telecommunication equipment, electrical measuring equipment, electronic capital goods & passive electronic components
- 345 other electronic equipment
- 346 domestic-type electric appliances
- 347 electric lamps & other electric lighting equipment
- 348 electrical equipment installation

35 Manufacture of motor vehicles & parts thereof
- 351 motor vehicles & their engines
- 352 motor vehicle bodies, trailers & caravans
- 353 motor vehicle parts

36 Manufacture of other transport equipment
- 361 shipbuilding & repairing
- 362 railway & tramway vehicles
- 364 aerospace equipment manufacturing & repairing

37 Instrument engineering
- 371 measuring, checking & precision instruments & apparatus

372 medical & surgical equipment & orthopaedic appliances
373 optical precision instruments & photographic equipment

4 Other manufacturing industries

41/42 Food, drink & tobacco manufacturing industries

412 slaughtering of animals & production of meat & by-products
413 preparation of milk & milk products
414 processing of fruit & vegetables
415 fish processing
416 grain milling
419 bread, biscuits & flour confectionery
420 sugar & sugar by-products
421 ice cream, cocoa, chocolate & sugar confectionery
423 miscellaneous foods
426 wines, cider & perry
427 brewing & malting
428 soft drinks
429 tobacco industry

43 Textile industry

431 woollen & worsted industry
432 cotton & silk industries
433 throwing, texturing, etc of continuous filament yarn
435 jute & polypropylene yarns & fabrics
436 hosiery & other knitted goods
437 textile finishing
438 carpets & other textile floor coverings
439 miscellaneous textiles

44 Manufacture of leather & leather goods

441 leather (tanning & dressing) & fellmongery
442 leather goods

45 Footwear & clothing industries

451 footwear
455 household textiles & other made-up textiles

46 Timber & wooden furniture industries

461 sawmilling, planing, etc of wood
462 manufacture of semi-finished wood products & further processing & treatment of wood
463 builders' carpentry & joinery
465 other wooden articles (except furniture)
467 wooden & upholstered furniture and shop & office fittings

47 Manufacture of paper & paper products; printing & publishing

471 pulp, paper & board
472 conversion of paper & board
475 printing & publishing

48 Processing of rubber & plastics

481 rubber products
483 processing of plastics

49 Other manufacturing industries

491 jewellery & coins
494 toys & sports goods
495 miscellaneous manufacturing industries

5 Construction

50 Construction

500 general construction & demolition work
501 construction & repair of buildings
502 civil engineering
503 installation of fixtures & fittings
504 building completion work

6 Distribution, hotels & catering (repairs)

61 Wholesale distribution (except dealing in scrap & waste materials)

611 wholesale distribution of agricultural raw materials, live animals, textile raw materials & semimanufactures
612 wholesale distribution of fuels, ores, metals & industrial materials
613 wholesale distribution of timber & building materials
614 Wholesale distribution of machinery, industrial equipment & vehicles
615 wholesale distribution of household goods, hardware & ironmongery
616 wholesale distribution of textiles, clothing, footwear & leather goods
617 wholesale distribution of food, drink & tobacco
618 wholesale distribution of pharmaceutical, medical & other chemist's goods
619 other wholesale distribution including general wholesalers

62 Dealing in scrap & waste materials

621 dealing in scrap metals
622 dealing in other scrap materials, or general dealers

63 Commission agents

630 commission agents

64/65 Retail distribution

641 food retailing
642 confectioners, tobacconists & newsagents; off-licences
643 dispensing & other chemists
646 retail distribution of footwear & leather goods
647 retail distribution of furnishing fabrics & household textiles
648 retail distribution of household goods, hardware & ironmongery
651 retail distribution of motor vehicles & parts
652 filling stations (motor fuel & lubricants)
653 retail distribution of books, stationery & office supplies
654 other specialised retail distribution (non food)
656 mixed retail businesses

66 Hotels & catering

661 restaurants, snack bars, cafes & other eating places
663 night clubs & licensed clubs
664 canteen & messes
665 hotel trade
667 other tourist or short-stay accommodation

67 Repair of consumer goods & vehicles

671 repair & servicing of motor vehicles

672 repair of footwear & leather goods
673 repair of other consumer goods

7 Transport & communication

71 Railways
710 railways

72 Other inland transport
721 scheduled road passenger transport & urban railways
722 other road passenger transport
723 road haulage

74 Sea transport
740 sea transport

75 Air transport
750 air transport

76 Supporting services to transport
761 supporting services to inland transport
763 supporting services to sea transport
764 supporting services to air transport

77 Miscellaneous transport services & storage nec
770 miscellaneous transport services & storage nec

79 Postal services & telecommunications
790 postal services & telecommunications

8 Banking, finance, insurance, business services & leasing

81 Banking & finance
814 banking & bill-discounting
815 other financial institutions

82 Insurance, except for compulsory social security
820 insurance, except for compulsory social security

83 Business services
831 activities auxiliary to banking & finance
832 activities auxiliary to insurance
834 house & estate agents
835 legal services
836 accountants, auditors, tax experts
837 professional & technical services nec
838 advertising
839 business services

84 Renting of movables
842 hiring out construction machinery & equipment
846 hiring out consumer goods
848 hiring out transport equipment

85 Owning & dealing in real estate
850 owning & dealing in real estate

9 Other services

91 Public administration, national defence & compulsory social security

911 national government service nec
912 justice
913 police
914 fire services
915 national defence
919 social security

92 Sanitary services

921 refuse disposal, sanitation & similar services
923 cleaning services

93 Education

931 higher education
932 school education (nursery, primary & secondary)
933 education nec & vocational training
936 driving & flying schools

94 Research & development

940 research & development

95 Health and veterinary services

951 hospitals, nursing homes etc
952 other medical care institutions
954 dental practices
956 veterinary practices & animal hospitals

96 Other general services to the public

961 social welfare, charitable & community services
963 trade unions, business & professional associations
966 religious services & other cultural services
969 tourist offices & other community services

97 Recreational services

971 film production, distribution & exhibition
974 radio & television services, theatres etc
976 authors, music composers & other own account artists nec
977 libraries, museums, art galleries etc
979 sport & other recreational services

98 Personal services

989 personal services nec

99 Domestic services

990 domestic services

Table A1

Mobility across Industry Sectors (%)

Present / ***Most recent***	*Energy & water supplies*	*Extraction etc.*	*Metal goods etc.*	*Other manuf.*	*Construct.*	*Distribution etc.*	*Transport & communication*	*Banking & finance*	*Other services*
Energy & water supplies	85.6	1.8	0.2	0	0.5	1.6	0.4	0.7	0.6
Extraction etc.	2.8	77. 3	3.5	1.9	0.5	1.2	0.2	0.5	0.1
Metal goods etc.	1.1	11.1	85.1	2.9	6.6	3.8	1.1	2.5	0.9
Other manuf.	0	4.9	3.0	88.6	1.5	5.4	0.2	1.4	0.2
Construction	0	2.2	1.5	1.2	72.1	0.8	0.2	1.6	2.8
Distribution etc.	4.4	1.3	2.6	3.6	3.1	83.0	3.1	1.8	0.8
Transport & communication	1.1	0.4	1.1	0.7	0.5	1.4	90.9	1.6	0.4
Banking & finance	1. 7	0.4	1.7	0.9	5.6	1.2	1.8	84.9	2.1
Other services	3.3	0.4	1.5	0.3	9.6	1.8	2	5.2	92.3
Total	100	100	100	100	100	100	100	100	100

Note: Mobility of individuals across industry sectors between current and most recent previous observed employment spell. Figures based on the unbalanced panel sample used in the paper.

Table A2

Mobility across Occupations (%)

Present / ***Most recent***	*Managers & administrators*	*Professional*	*Associate professional & technical*	*Clerical & secretarial*	*Craft & related*	*Personal & protective service*	*Sales*	*Plant & machine operatives*	*Other*
Managers & administrators	79.2	4.6	5.0	7.6	2.4	1.6	12.3	1.5	1.4
Professional	4.3	82.2	8.6	2.2	0.5	0.6	1.8	0.8	0.5
Associate professional & technical	4.5	7.4	71.8	7.9	1.3	1.6	3.1	1.3	1.4
Clerical & secretarial	3.7	2.3	4.2	69.2	0.7	0.3	6.1	2.3	3.1
Craft & related	3.8	1.4	3.6	1.9	84.7	0.6	1.2	9.7	4.0
Personal & protective service	0.8	0.4	2.1	0.6	0.7	92.2	0.0	0.8	0.9
Sales	2.3	0.2	1.3	3.2	0.4	0.0	73.0	0.3	0.9
Plant & machine operatives	1.2	1.4	2.9	5.1	8.1	1.9	1.8	80.9	6.7
Other	0.3	0.2	0.6	2.2	1.2	1.3	0.6	2.4	81.2
Total	100	100	100	100	100	100	100	100	100

Note: Mobility of individuals across occupations between current and most recent previous observed employment spell. Figures based on the unbalanced panel sample used in the paper.